MCF 3M

Exponentials Unit Review

1. Evaluate the following:

a) 2^3 b) 3^{-2} c) 6^0+4^2 d) $(3^2)^3$ e) $3^2\times3^3$ f) $32^{\frac{2}{5}}$

g) $\frac{3^2}{3^4}$ h) $3^0\times3^2$ i) $\sqrt[3]{125^2}$ j) $\sqrt[3]{729}$ k) $729^{\frac{1}{3}}$ l) $\sqrt{9}\times3^3$

2. Evaluate: $25(0.56)^3$

3. Evaluate: $250(0.75)^{\frac{1}{5}}$

4. Evaluate: $4500(\frac{3}{4})^{\frac{4}{3}}$

5. A yeast cell culture has initially 250 cells and doubles every 30 min. How many cells will there be in 4 hours?

6. The population of a certain bacteria in an infected wound triples every 20 min. How many bacteria cells would there be after 3 hours if there are 1000 cells initially?

7. The mass of a radioactive substance decreases to half its value every 125 days. What would be the mass of a 500 g sample after 2 years?

8. The population of a small Ontario town in years 1990, 1995, and 2000 is 713, 736, and 759, respectively. Does this represent exponential growth, linear growth or neither?

9. The population of a bacteria colony triples every hour. Its initial population is 1500. The equation that models the population (N) of this colony after t hours is:

10. The population of a bacteria colony doubles every 30 min. If the initial population is 250, how many bacteria would there be in 5 hours?

11. A committee of four people wants to contact people in their community about a local fundraising activity. Each one agrees to contact three people who will then contact three new people and so on. If it takes 15 min to contact three people, approximately how many people will be contacted after 5 hours?

12. Which of the tables below could be modeled with an exponential function?

x	y
1	2.5
2	6.25
3	15.625
4	39.063
5	97.656
6	244.14

x	y
1	7.3
2	9.6
3	11.9
4	14.2
5	16.5
6	18.8

x	y
1	16
2	25
3	36
4	49
5	64
6	81

x	y
5	6.75
6	10.125
7	15.188
8	22.781
9	34.172
10	51.258

13. A biologist is conducting a long-term study of the decline of the frog population in a beaver pond. The population was 267 in 1995 and 178 in 2002. Assuming an exponential decay model, determine:
a) the annual decay rate as a percent;
b) the predicted population in 2010; and
c) the population in 1980.